

## **Evaluating the Working Condition of the HVAC System**

The heating, ventilating, and air conditioning (HVAC) system is the most complex system in the home. The best person to perform a thorough inspection of the HVAC system is a licensed HVAC contractor.

Some home HVAC systems are powered by electricity, some by fossil fuels (oil, natural gas); some are split systems and some are single package systems. A split system has one of its heat exchangers (which includes the compressor) located outdoors and the other (the indoor coil) located indoors. A single package system has both heat exchangers located in the same unit, usually outdoors. Most residential central air conditioners and heat pumps are split systems.

The cooling unit of a compressor, condenser, evaporator, pipes and tubing to carry refrigerants and lubricants throughout the system, blowers, and fans, valves to control the circulation of refrigerant, and controls to regulate the functions of the unit.

When undertaking an inspection of the HVAC system, home inspectors should take the following steps:

Locate thermostat and turn thermostat on. Check thermostat operation—determine if it will turn the system on and off, that heating will start and that cooling will start.

When the thermostat switch is in the fan “on” position, make sure that the fan is running. Listen for unusual sounds while feeling how cool the air flow is from the vents. Don’t just listen inside the house, go outside and listen to the condensing unit, too. Any unusual sounds indicate a need for service by a qualified HVAC contractor.

Inspect all grilles and registers. Dirt in or around the registers and grilles indicates that the filter is dirty and needs to be changed. Such dirt may also indicate that the duct system needs cleaning by a professional.

Check filter. If filter is dirty, it needs to be changed or cleaned.

Inspect duct work. Duct work in unconditioned spaces (such as parts of the basement and attic) should be insulated. Duct work may sometimes sweat if it is not insulated. To determine if there is any duct leakage, check for air from duct connections and fittings.

Inspect evaporator coil—note condition of coil and drain. Rust on the outside and in the drain pan could indicate excess moisture which could contribute to mold, mildew and other conditions which may affect air quality.

For gas furnaces, light and start the furnace. Watch for flame roll out or flutter when blower comes on. Proper color of flame is blue base with a slight yellow tip.

The items above are guidelines for a cursory inspection of the home heating and cooling system. This inspection verifies that the system operates and that there are no obvious problems. A thorough inspection will include checking operating voltages, recording the temperature differences across the evaporator coil and the heat exchanger, performing a complete safety check, measuring air flow at all duct outlets and returns, and many other technical evaluations. These inspections must be performed by a licensed HVAC contractor.

In addition to the above, the home inspector should note the age and efficiency rating of the equipment. Central air conditioning systems are rated by the seasonal energy efficient ratio (SEER). The National Appliance Energy Conservation Act (NAECA) of 1987 sets national standards for residential air-cooled central air conditioners and air-source heat pumps. NAECA provides for a federal minimum standard of 10.0 SEER for split-system heat pumps and air conditioners, effective January 1, 1992, and 9.7 SEER for single package air conditioners and heat pumps, effective January 1, 1993. Heat pumps are also subject to federal standards of 6.8 heating seasonal performance factor (HSPF) for split systems, effective January 1, 1992, and 6.6 HSPF for single packages, effective January 1, 1993.

Home inspectors should determine the SEER or HSPF of the equipment and make recommendations for up2001 Grades, if appropriate. The homeowner benefits from a higher SEER or HSPF because less energy will be used to cool or heat the house, resulting in lower utility bills.

Home inspectors should always recommend that the owner have a complete and exhaustive system check, performed by a licensed HVAC contractor.